(No Model.)

2 Sheets—Sheet 1.

C. J. VAN DEPOELE.

TELPHER SYSTEM.

No. 429,747. Patented June 10, 1890.

Fig. 2.

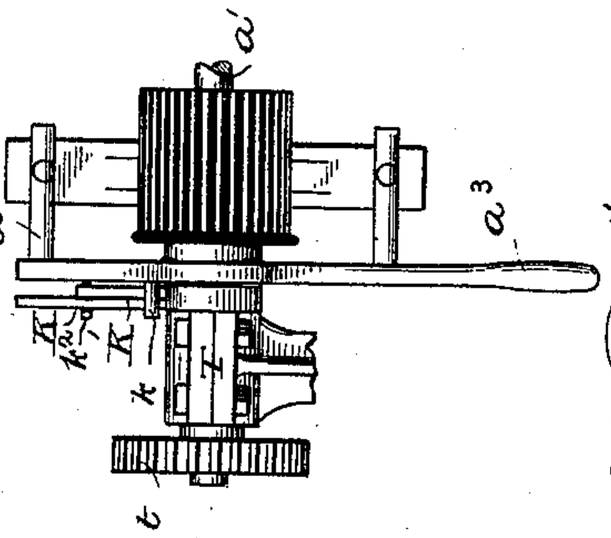

Fig. 1.

Witnesses

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

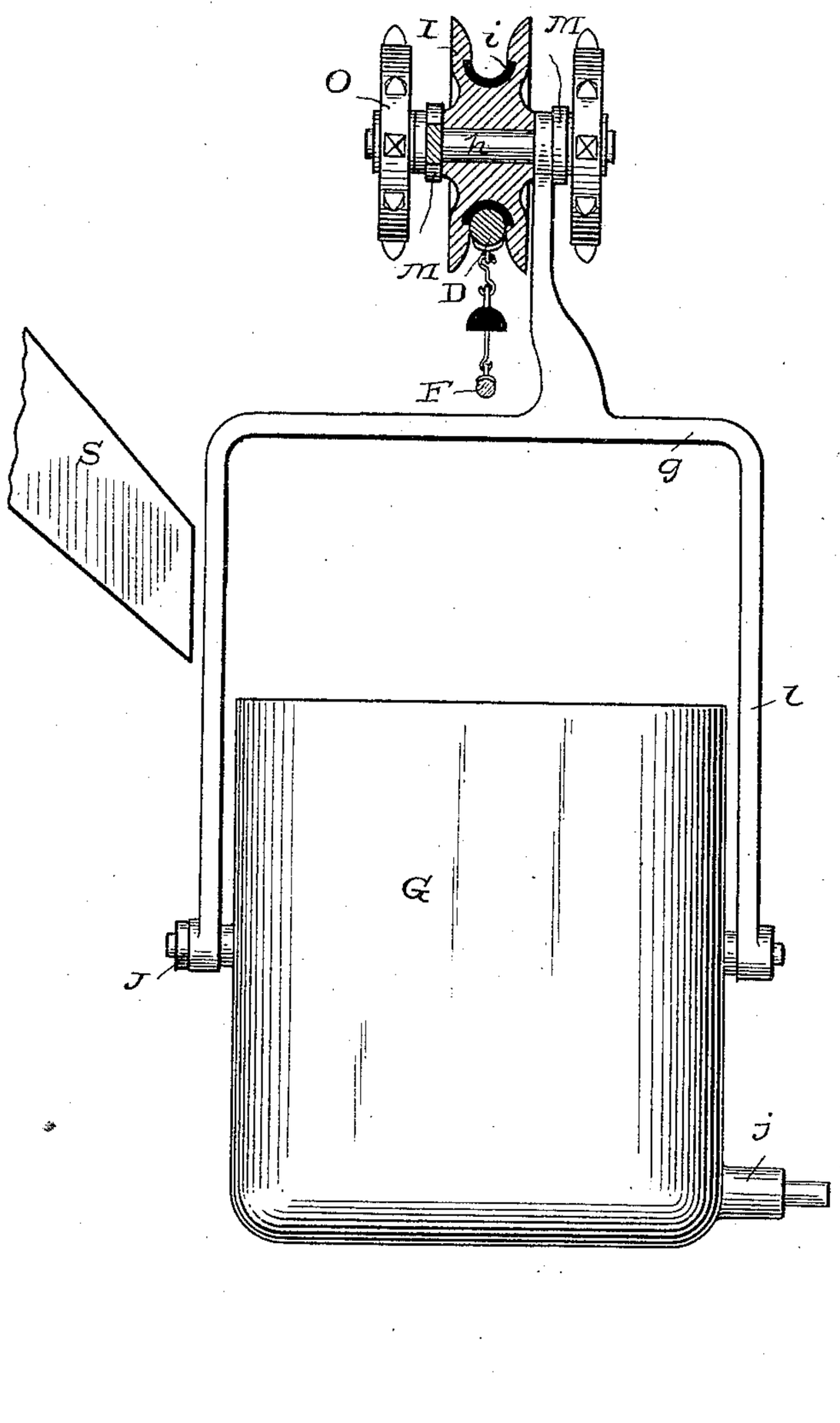
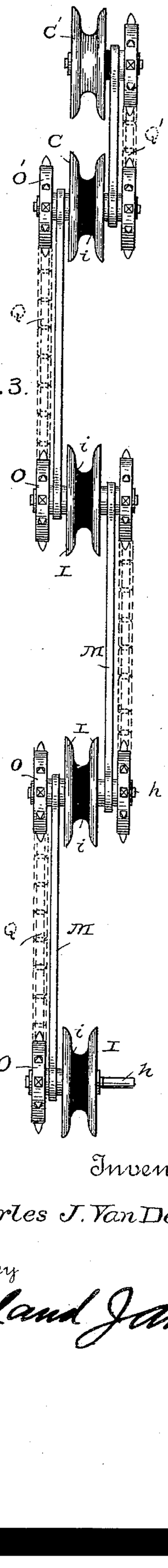


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES J. VAN DEPOELE, OF CHICAGO, ILLINOIS.

TELPHER SYSTEM.

SPECIFICATION forming part of Letters Patent No. 429,747, dated June 10, 1890.

Application filed May 13, 1887. Serial No. 238,049. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. VAN DEPOELE, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Telpher Systems, of which the following is a description.

The present invention relates to improvements in systems of telpherage, and is partly an improvement on the systems for which Letters Patent No. 329,104 were granted to me October 27, 1885, and No. 331,851, December 8, 1885; and it further consists in the various details of construction, arrangement, and operation hereinafter set forth.

In the accompanying drawings, Figure 1 is a view in elevation showing a system of cable-conveying apparatus embodying my invention. Fig. 2 is a detail view of the commutator-brushes and their shifting and setting mechanism. Fig. 3 is a top plan view of the supporting and driving wheels and connections. Fig. 4 is an elevation, partly in section, showing one of the buckets and its supporting and carrying attachments.

Similar letters and numerals denote like parts throughout.

In the drawings, A represents the motor-car, upon which is mounted an electro-dynamic motor *a* of any desired pattern. This car is supported by strong metallic arms B B, extending upward therefrom and secured at their upper extremities to the axles *b* of a pair of grooved supporting and driving wheels C C′, which travel upon a strong metallic cable D, which is supported in any suitable manner upon posts *d*, placed at suitable or convenient distances along the route to be traversed. The conductor D is connected directly to the source of electricity through a manual-switch E and conductor E′, and the main current is led to the motor from one of the traction-wheels—for example, the wheel C′—and is returned to a second (negative) conductor F, through a small additional roller *f*, which is insulated from the rest of the frame, but in connection with the motor-circuit; but I may, if preferred, use a second additional roller *f′* for taking the current from the main conductor D, instead of using one of the main traction-wheels, the reason for which will be explained. The length of the trains to be run upon this cable-way by one motor will vary according to the steepness of the grades to be overcome and the general strength and design of the installation, and therefore, for the sake of illustration, I have only shown two buckets as attached and one motor-car, the principle being the same whether two or twenty are so attached. In any event the entire train is so connected as to move together as a unit.

G and H are two separate vehicles in the form of buckets, within which the freight to be transported by the system is deposited. Their size, shape, and material will depend upon the nature of their use; but in the present instance I have shown them as metallic caldrons of the shape usually used in hauling and handling ores and coal. Each bucket is supported by a strong metallic bail *g*, which is pivotally connected to the bucket at about its central point, and, extending upward, is secured upon the axle or axis *h* of a carrying-wheel I, by which it is wholly supported upon the cable D. The buckets are prevented from jostling against each other or in any way changing their relative positions by means of connecting-rods J, which are placed upon and extend between the pivotal supports of each of the buckets. Each bucket is further provided with a projecting boss *j* near its lower edge, upon which bosses are secured other connecting-rods J′, from the foremost one of which extends a rod K, which is formed with a slot *k′* in its free end which engages a pin k^2, extending from a pivoted lever-arm K′, mounted upon the bearing of the armature-shaft of the motor, said lever-arm being in position to engage a projection *k*, extending from the commutator-brush carrier, by means of which, when the buckets are dumped to discharge their contents, the position of the said commutator-brushes will be reversed by the thrust of the rod K against pin *k′*, the direction of rotation of the armature of the motor reversed and the train carried back to its starting-point. From the last link J′ extends an arm L, and when the train has reached the end of its route, where it is desired to empty the buckets by inverting them, said arm L will strike against a stop placed to receive it, and by so doing will, through the remaining inertia of the moving

buckets, completely invert them, the bosses *j* traversing the path shown by the dotted arrows and coming to rest against the bails *g* at the point marked *l*. The bosses *j* being placed rearward of the vertical center of the buckets, the buckets will be completely inverted and remain in that position until forcibly turned back. At the same time that the buckets are inverted, as just described, the arm K will, as described, operate to throw the arm K′ and shift the commutator-brushes and place the motor in condition to start back automatically with its load of inverted buckets. The motion of the rod K when the buckets are reversed is forward from the position shown in full lines, Fig. 1, and then backward to the dotted position shown. It is desired during that movement to throw the arm K′ to its rearward position and leave it there. This is accomplished by the slot in the rod K, which allows the said rod to throw the arm K′ forward and then complete its own backward movement without affecting the arm K′, the pin *k′* being moved to the other end of the slot, which is of a length sufficient to admit of the necessary movement.

In each of the main carrying-wheels included in the train I insert a lining of rubber, or some other such material, which, being somewhat elastic in its nature, will very greatly increase the tractive power of the wheels on the cable and counteract the great tendency to slip on upgrades or when the cable is wet or icy, and will also very greatly decrease the wear thereupon, and in that manner very much prolong its life. I also provide for utilizing the tractive power of all the weight to be moved, since it would otherwise often happen that the electromotor, while capable of moving the train attached to it, would be wholly unable to do so because of insufficient traction upon its own supporting-wheels, to increase which to the point of enabling the motor-car to pull all it could would unnecessarily add to the cost of moving the train. I attain most satisfactory results without increased expense by connecting each of the axles *h* of the supporting-wheels I by links M, which correspond with the links J between the buckets and serve to keep said carrying-wheels in fixed relation to each other.

In Fig. 3 I have shown three sets of carrying-wheels I, all connected by links M, as will be readily understood, and when more buckets are used the same arrangement is continued throughout. Upon the axles *h*, connected as described, I place sprocket-wheels O, supplying each axle with a pair of sprocket-wheels—one on each side—although a single one is all that is required for the last bucket in the train, and upon these sprocket-wheels are placed endless link chains Q, each chain extending from the sprocket-wheel of one bucket to the sprocket-wheel of the next on one side and from the opposite sprocket-wheel to the one on the next car on the same side, and so on up to the main sprocket-wheel O′ of the motor, as indicated in dotted lines in said Fig. 3 and shown in full in Fig. 1. In this manner all the supporting-wheels throughout the train will be positively connected, so that their entire tractive force can be used to propel them along the cable.

I do not limit myself to necessary connection of all the wheels in each train under any and all conditions, because it may happen that a less number will answer the purpose; but I propose to use all the wheels, as described, wherever it may be necessary to do so.

R is a bin or structure from which the buckets are loaded through spouts S, placed the proper distance apart to discharge into the buckets which are returned to their position for loading while still inverted, as indicated in dotted lines, Fig. 1, and are then righted and loaded, after which they are ready to repeat their journey. Upon the armature-shaft *a′* of the motor is placed the usual commutator-brush holder a^2, to which is secured a hand-lever a^3 for operating the motor. Upon the said armature-shaft, or upon the main bearing T therefor, is journaled the inner end of the link K′, attached to the reversing-rod K, and to the extremity of the said armature-shaft is attached a gear-wheel *t*, which meshes with a gear-wheel *t′*, mounted upon an independent shaft U, secured to the motor-frame in a convenient manner and provided with a sprocket-wheel *u*, which is connected by a link belt Q′ with the sprocket-wheel *q* upon the axes of the supporting-wheels C C′ of the motor.

From the sprocket-wheel O′, attached to wheel C, is connected the linked belt Q, extending rearward to the sprocket-wheel O of the bucket G. The carrying-wheel C′ of the motor is shown as all metal, in order that it may act as a traveling contact to take the current from the main conductor D to the motor. If, however, it should be found desirable, I may provide this wheel also with the anti-friction lining *i*, and attach a small roller between the carrying-wheels C C′ for the sole purpose of forming the traveling connection between the motor and the main conductor. The main conductor is shown as having two terminals 1 and 2, both of them in the path of the switch E, leading from the source of supply. The motor-carriage is provided at its front end with a pin or projection V, and there is also provided a stop or abutment W, and as the train returns to its original position it is intended that its speed shall be checked by a suitable arrangement of grades to a point where its momentum will not be capable of inflicting damage to the apparatus when it will come to rest against the abutment W, at which time the projection V will strike the switch E, throwing it off from contact 1, and breaking the main circuit. While in this condition the inverted buckets may be righted, when, being in position in front of their loading-spouts, they can be readily

loaded for a second trip. The link K′ having been moved away from the pin *k* when the buckets were righted, the commutator brushes can now be moved to their forward position by the handle a^3 without obstruction, after which, by moving the switch E still farther and onto the contact 2, the main circuit will be again completed and the train when loaded started on another trip. After the train has started or has been moved, say, a few inches, the switch E is to be moved back into its first position on contact 1, so as to be ready to receive the blow of the projection V on the return of the apparatus.

Although I have described my invention with particularity and exactness, I do not limit myself to the precise details shown, since various minor modifications and changes may be made without departing from the spirit of the invention.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a system of telpherage, the combination of a cable, a motor-car, and one or more freight-vehicles arranged to travel thereupon, the supporting-wheels of the vehicle and those on the motor-car being mechanically connected, substantially as described.

2. In a system of telpherage, the combination of a cable, a motor-car, and one or more freight-cars thereon, sprocket-wheels attached to the supporting-wheels thereof, and endless belts connecting the separate sets of sprocket-wheels, substantially as described.

3. In a system of telpherage, the combination of a cable, supporting-wheels traveling thereon and provided with sprocket-wheels upon the axes, vehicles depending from said supporting-wheels, rigid separating-links between said supporting-wheels, and mechanical connections consisting of a power-transmitting connection between the separate sets of sprocket-wheels throughout the train, substantially as described.

4. In a system of telpherage, the combination, with a motor-car and freight vehicles or buckets, of carrying-wheels supported upon the main cable, bails carried by the axles of the wheels for supporting said buckets, rigid mechanical connections between the points at which said bails are connected to the buckets, and similar connections between the axes of the several supporting-wheels, whereby the buckets are caused to move in fixed relation with each other, substantially as described.

5. In an electric railway, the combination of the traveling vehicle and an electric motor for actuating it with a buffer, and lever mechanism operated by said buffer to change the relative position of the commutator-sections with the brushes to reverse the motor, substantially as and for the purpose specified.

6. In a system of telpherage, the combination, with a motor-car and freight-vehicles attached thereto, of mechanical connections between the said vehicles, said connections terminating at one end in a projecting arm and at the other in a link connected to the commutator-brush holder of the motor and adapted when moved rearward, as on striking a stop, to shift the brushes of the commutator, substantially as described.

7. In a system of telpherage, the combination, with a motor-car, vehicles or buckets for receiving the freight, suitable pivotal supports for said buckets, and a series of connecting-links extending throughout the train and terminating at one end in a projecting arm and at the other in a pivoted link connected with the commutator-brush carrier, of the motor, whereby when the buckets are inverted the brushes of the motor will be moved to a reverse position and automatically start the train backward, substantially as described.

8. The combination of a motor-car and motor, a journaled lever and connections extending therefrom to the vehicles and a commutator-brush holder provided with a projection or stop in the path of the journaled lever and with a handle extending from the motor-car for returning the brushes to their forward position, substantially as described.

9. In a system of telpherage, the combination, with the motor-car, of a switch in the main circuit, and a projection on said car arranged to move said switch and open the main circuit when said car is returned to its first position, substantially as described.

In testimony whereof I hereto affix my signature in presence of two witnesses.

CHARLES J. VAN DEPOELE.

Witnesses:

WILLIAM A. STILES,

W. A. KREIDLER.